

Commonwealth of Kentucky
Division for Air Quality
PERMIT STATEMENT OF BASIS

TITLE V DRAFT PERMIT No. V-06-053

AMERICAN ELECTRIC POWER

BIG SANDY POWER PLANT

LOUISA, KY

JANUARY 10, 2007

ESMAIL HASSANPOUR/MARTHA ALLMAN, REVIEWERS

SOURCE PLANT I.D.#:	21-127-00003
SOURCE A.I. #:	2610
ACTIVITY APPLICATION LOG #:	APE20040001

SOURCE DESCRIPTION:

A renewal Title V operating permit application was received on June 17, 2004 from American Electric Power (AEP) for its Big Sandy Power Plant located near Louisa, Kentucky in Lawrence County. The submittal included a Compliance Assurance Monitoring (CAM) plan. A revised CAM plan was filed on April 20, 2006. The application was deemed administratively complete on September 11, 2004.

The Big Sandy Power Plant is a fossil fuel-fired electric generation facility that provides retail and wholesale electricity. The facility consists of two (2) coal-fired steam generators with a rated design capacity of 2512 mmBTU/hr (260 MW) and 7914 mmBTU/hr (800 MW), both with back-up #2 fuel oil capability, an oil-fired auxiliary boiler rated at 642 mmBTU/hr, various supporting operations including coal and ash handling, and various tanks with insignificant emissions. The facility currently operates under permit number V-97-009 R1.

On September 9, 2004, AEP filed information about its plans to replace the existing Station 11 rotary railcar unloading equipment with a fixed bridge structural arrangement to allow for the unloading of bottom dump railcars. The capacity of the unloading system will remain 2600 tons/hour, and the existing feeders and crushers will not change. Therefore, there will be no increase in particulate emissions over the existing system. This change has been incorporated into this permit.

On August 29, 2005, AEP filed information relating to its plans to construct a flue gas desulfurization (FGD) system and associated support equipment at Unit 2 and requested that the FGD system be incorporated into this permit. However, sufficiently detailed information is not currently available to incorporate the FGD system into the permit at this time. It is the Division's understanding that AEP will file an application for a permit revision when more information is available.

On November 7, 2005, AEP filed its Title IV, Acid Rain Permit Application, Phase II NO_x Compliance Plan, and Phase II NO_x Averaging Plan, which are incorporated into this permit.

On April 3, 2006, AEP filed cost information relating to its Big Sandy Unit 2 electrostatic precipitator (ESP) upgrade that was performed in 2002. The scope of the work included replacing electrodes and plates, installing additional rapping equipment, and replacing out-dated controls. The cost of the upgrade was \$15.9 million, whereas AEP estimates that a new particulate control device would cost between \$40-60 million. The Division has determined that these modifications are not replacements as contemplated by 401 KAR 61:015 Section 4(4) due to the limited scope, such as no replacements of ductwork or structural components, and low cost of the project relative to a new control device. 401 KAR 61:015 Section 4(4) provides that:

“The emission limitations contained in other subsections of this section shall not apply to any affected facility (with more than 250 million BTU per hour heat input capacity which was in being or under construction before August 17, 1971, or any affected facility with 250 million BTU per hour capacity or less which was in being or under construction prior to April 9, 1972) if that affected facility was in compliance prior to April 9, 1972, with or has a valid permit to operate within the provisions of the previous Kentucky Air Pollution Control Commission Regulation No. 7 entitled “Prevention and Control of Emissions of Particulate Matter from Combustion of Fuel in Indirect Heat Exchangers.” These affected facilities shall comply with the emission limitations in that administrative regulation except that replacement of the particulate emissions control device associated with the affected facility shall be subject to the standard contained in this section.”

This regulation allows certain units operating and in existence prior to the promulgation of 401 KAR 61:015 to continue to operate pursuant to Regulation 7, unless the particulate emissions control device was replaced. If the particulate emissions control device was replaced, it would then be reasonable to require that the replacement meet the more stringent standards in 401 KAR 61:015. However, this provision was not intended to discourage proper maintenance. In this particular situation, the upgrades were motivated by concerns of possible degradation of the ESP's performance when SCRs were installed at Unit 2¹. Therefore, these factors, combined with the low cost relative to a replacement and the lack of significant structural modifications, has led the Division to determine that the ESP upgrades identified by AEP do not constitute “replacement of the particulate emissions control device” as that phrase is used in 401 KAR 61:015 Section 4.

The following is a list of significant units:

- E. Unit 01: BSU1: 2512 mmBTU/hour (260 MW) pulverized coal-fired, dry bottom, wall-fired unit constructed on or before January 1963, equipped with overfire air, low NO_x burners and an electrostatic precipitator. No.2 fuel oil is used for backup, startup, and stabilization.
- E. Unit 02: BSU2: 7914 mmBTU/hour (800 MW) pulverized coal-fired, dry bottom, wall-fired unit constructed on or before October 1969, equipped with an electrostatic

¹ See letter dated September 11, 2002, from Jeffrey D. Clark, P.E., with AEP to Koorosh Farhoudi with the Division for Air Quality.

precipitator, ammonia flue gas conditioning, low NO_x burners, and selective catalytic reduction. No.2 fuel oil is used for backup, startup, and stabilization.

E. Unit 04: AUX2 (Auxiliary Boiler 2) - 642 mmBTU/hour No. 2 fuel oil-fired unit constructed on or before December 1969.

E. Unit 05: Truck dump unloading, coal conveying and handling constructed on or before 1991.

E. Unit 06: Coal unloading, conveying, crushing, stockpiles and handling constructed on or before 1969, rail car unloading system upgraded in 2004

REGULATION APPLICABILITY:

E. Unit 01 and E. Unit 02: Coal-Fired Indirect Heat Exchangers, installed in 1969

The following regulations are applicable to these units:

401 KAR 61:015	Existing indirect heat exchangers applicable to an emission unit with a capacity of more than 250 mmBtu/hour and commenced before August 17, 1971
Regulation 7	Prevention and Control of emission of Particulate Matter from Combustion of Fuel Indirect Heat Exchangers
401 KAR 52:060	Acid rain permits
401 KAR 51:160	NO _x requirements for large utility and industrial boilers
40 CFR Part 64	Compliance Assurance Monitoring

Pursuant to 401 KAR 61:015, Section 4(3), 4(4), and Regulation No. 7, emissions shall not exceed 40 percent opacity based on a six-minute average except:

- (i) That, for cyclone or pulverized fired indirect heat exchangers, a maximum of 60 percent opacity shall be permissible for not more than one 6-minute period in any 60 consecutive minutes.
- (ii) Emissions from an indirect heat exchanger shall not exceed 40 percent opacity based on a six minute average except for emissions from an indirect heat exchanger during building a new fire for the period required to bring the boiler up to operating conditions provided the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendations.

Pursuant to 401 KAR 61:015, Section 4(4) and Regulation 7, emissions of particulate matter (PM) shall not exceed 0.24 lb/mmBTU based on a 3-hour average.

Pursuant to 401 KAR 61:015, Section 5, emissions of sulfur dioxide (SO₂) shall not exceed 6 lb/mmBTU based on a 24-hour average.

401 KAR 52:060, Acid rain permits, incorporates by reference 40 CFR Parts 72 to 78. These units have SO₂ allowances as listed in 40 CFR, Part 73.10 for each year from 2006 to year 2010. E. Unit 01 has 6,428 SO₂ allowance allocations for the years 2006 to 2009, then 6,441 allowances beginning in the year 2010. E. Unit 02 has 19,711 SO₂ allowance allocations for the years 2006 to 2009, then 18,584 allowances beginning in the year 2010. The NO_x limit and the averaging plans are established by 40 CFR 75 and 76.

401 KAR 51:160, NO_x requirements for large utility and industrial boilers, and 40 CFR 97, Subpart C, applies to these units. The NO_x Budget Permit application for these units was submitted to the Division, and received on November 4, 2002. Requirements contained in that application were incorporated into and made part of the NO_x Budget Permit. Pursuant to 401 KAR 52:020, Section 3, the source shall operate in compliance with those requirements.

The CAM plan filed on April 20, 2006 primarily addresses PM. CAM. E. Unit 2 is equipped with an SCR, so CAM does apply to NO_x for this unit. However, as Continuous Emission Monitoring of SO₂ and NO_x is required pursuant to 40 CFR Part 75, 40 CFR 64.3(d) requires that the CEM system also be used to satisfy CAM requirements.

AEP does not continuously monitor PM, but does monitor opacity through its Continuous Opacity Monitoring (COM) system. Therefore, AEP plans to use stack opacity, as measured by the COM system, as an indicator of PM compliance. During a stack test, PM emissions will be measured at or near the PM or opacity limit of each unit. If the test results suggest that PM emissions are less than the permitted PM emission limit when opacity is maintained under a certain level, this would be an indication that the unit will be operating with a reasonable assurance of compliance with the PM limit. AEP proposes to establish the indicator at 90% of the opacity determined during the testing or the opacity limit of 40%, whichever is greater. If opacity exceeds the indicator, plant personnel will begin investigative procedures to determine the status of the control equipment and take appropriate corrective action if necessary. If the status of the control equipment cannot be determined or the reason for the exceedance of the indicator range cannot be determined, a Method 9 opacity reading may be made, ambient conditions permitting.

The intent to establish the indicator level at 90% of the opacity determined during testing or the opacity limit of 40%, whichever is greater, does not appear to comply with 40 CFR 64.3(2) which requires that "operation within the ranges provides reasonable assurance of ongoing compliance with emission limitations or standards for the anticipated range of operating conditions." For example, if the PM limit is exceeded at 20% opacity, the above wording would result in the indicator level being set at 40%. For the period of time when opacity is between 20-40%, the indicator level would not provide reasonable assurance of compliance with the PM limit. The Division concurs with AEP's assessment that the CAM rule does not automatically preclude opacity-limited sources from

selecting a cap value above the opacity limit, based upon the results of testing.² However, the CAM rule would preclude selecting an opacity value as an indicator of PM compliance when testing has shown that PM is not in compliance at that level. Therefore, whether the opacity indicator level, as demonstrated by testing, is above or below the opacity permit limit is somewhat moot. The more relevant benchmark is whether or not the PM limit is exceeded at the opacity indicator level. As long as the PM limit is not exceeded at the selected opacity indicator level, then the intent of CAM has been satisfied. Therefore, the language in the permit about indicator level will read “The opacity indicator level shall be established at a level that provides reasonable assurance that particulate matter emissions are in compliance when opacity is equal to or less than the indicator level.”

AEP’s CAM contained a description of the testing methods which conceptually appears to satisfy CAM requirements. However, more detailed information will be required in order to ensure that conditions are representative of actual operating conditions. This type of information should be filed pursuant to 401 KAR 50:045, Performance Tests, prior to conducting indicator level testing.

E. Unit 04 (Auxiliary Boiler 2), installed in 1969:

Pursuant to 401 KAR 61:015, Section 5 (1), emissions of SO₂ shall not exceed 4.00 lb/mmBtu based on a 24-hour average. Compliance with the allowable sulfur dioxide standard may be demonstrated by calculating sulfur dioxide emissions using fuel oil usage rates, fuel analysis, and current AP-42 emission factor information.

Pursuant to 401 KAR 61:015, Section 4(3), 4(4), and Regulation No. 7, emissions shall not exceed 40 percent opacity based on a six-minute average except:

- (i) That, for cyclone or pulverized fired indirect heat exchangers, a maximum of 60 percent opacity shall be permissible for not more than one 6-minute period in any 60 consecutive minutes.
- (ii) Emissions from an indirect heat exchanger shall not exceed 40 percent opacity based on a six minute average except during building a new fire for the period required to bring the boiler up to operating conditions provided the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendations.

Pursuant to 401 KAR 61:015 Section 4 (4), and Regulation No. 7, particulate emissions shall not exceed 0.24 lb/mmBtu based on a 3-hour average as determined by the appropriate reference test method identified in 401 KAR 50:015. Compliance with the allowable particulate matter standard may be demonstrated by calculating particulate matter emissions using fuel oil usage rates, fuel analysis, and current AP-42 emission factor information.

Pursuant to 401 KAR 61:015, Section 6 (2), the sulfur content of liquid fuels, as burned, shall be determined based on certification from the fuel supplier. Pursuant to 401 KAR 61:015, Section 6

² This does not mean that it would be permissible to exceed the opacity limit, but rather simply means that if opacity is below the permitted limit, then it is likely that PM is below the PM limit as well.

(3), the rate of each fuel burned shall be measured quarterly on an as-burned basis and recorded. The heating value of fuel shall be ascertained at least quarterly and recorded.

E. Unit 05 (Truck dump unloading and coal conveyors), and installed in 1991:

401 KAR 61:005, incorporating by Reference 40 CFR 60, Subpart Y, Standard of performance for coal preparation plant.

Pursuant to 401 KAR 60:005, incorporating by reference 40 CFR 60 Subpart Y, 40 CFR 60.252, the owner or operator subject to the provisions of this regulation shall not cause to be discharged into the atmosphere from any coal processing and conveying equipment, coal storage system, or coal transfer and loading system processing coal, gases which exhibit twenty (20) percent opacity or greater.

Pursuant to 401 KAR 60:005, incorporating by reference 40 CFR 60 Subpart Y, 40 CFR 60.254, EPA Reference Method 9 and the procedures in 40 CFR 60.11 shall be used to determine opacity..

The permittee shall perform a qualitative visual observation of the opacity of emissions from control equipment on a weekly basis and maintain a log of the observations for Unit 5, Truck Dump operation. If emissions from any control equipment are visible, the permittee shall determine the opacity of emissions by Reference Method 9, initiate an inspection of the control equipment, and make any necessary repairs. This methodology may be used to assure compliance with the emission limitation.

E. Unit 06, Rapid Discharge Bottom Dumper (Station 11), car shake out facility (Station 1), crushers, conveyors and handling, Operating rate: 2600 tons/hour

401 KAR 63:010, Fugitive emissions is applicable to each affected facility which emits or may emit fugitive emissions and is not elsewhere subject to an opacity standard with the administrative regulations of the Division for Air Quality.

Pursuant to 401 KAR 63:010, Section 3, reasonable precautions shall be taken to prevent particulate matter from becoming airborne. Such reasonable precautions shall include, when applicable, but not be limited to the following:

- a. Application and maintenance of asphalt, application of water, or suitable chemicals on roads, material stockpiles, and other surfaces, which can create airborne dusts;
- b. Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials, or the use of water sprays or other measures to suppress the dust emissions during handling.
- c. Maintenance of paved roadways in a clean condition;

- d. The prompt removal of earth or other material from a paved street which earth or other material has been transported thereto by trucking or other earth moving equipment or erosion by water;
- e. Installation and use of compaction or other measures to suppress the dust emissions during handling.

Pursuant to 401 KAR 63:010, Section 3, discharge of visible fugitive dust emissions beyond the property line is prohibited.

For coal unloading, dumper, crushing operations, and conveying, the permittee shall assure compliance with 401 KAR 63:010 by using the control measures documented in the permit and/or required by regulation.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.

Past Permit Summary:

Rev #	Permit Number	Log or Activity #	Complete Date	Issuance Date	Summary of Action
	V-06-053	APE20040001	9/11/2004		Title V renewal
R1	V-97-009	53484	12/10/1996	5/15/2002	Revision to initial Title V
	A-98-002			1/1/2000	Acid Rain
	V-97-009	E704	12/10/1996	12/21/1999	Initial Title V
	AR-96-05			12/11/1996	Acid Rain